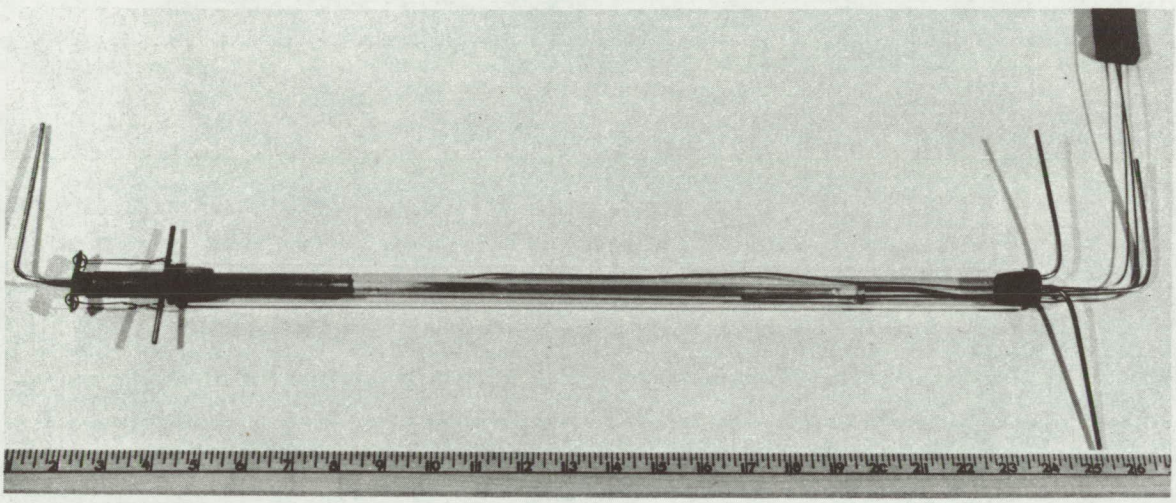
NASA TECH BRIEF

Device for Obtaining Separation of Oxygen



Permeation Tube Assembled Inside of Manifold
With Gas Delivery Tubes And Thermocouples

The problem:

Oxygen reclaiming systems using thin silver permeation membranes must operate at high temperatures in order for the permeation process to be effective. At the required temperatures (1300°F and greater) silver has a tendency to form large grains which weaken the material and permit leaks to develop after several hours of operation.

The solution:

It was discovered that an alloy of silver had the ability to permeate oxygen at the required temperatures for an extended period of operation without failure.

How it's done:

A magnesium-nickel alloy of silver was prepared in a tubular configuration 12″ long × 0.500″ OD × 0.0085″ wall thickness. The tube was inserted in a manifold which was then placed in an electric heater. The measured rates of oxygen permeation of this tube structure were higher than any previous rates published for pure silver. The permeation constant obtained for this experimental assembly was approximately 50% greater than the value predicted from previous research. The tubes fabricated from the silver alloy with trace quantities of magnesium and nickel are not standard, and hence, the wall thickness was much greater than normal. The wall thickness can be decreased significantly, perhaps to 0.005 inch with a direct increase in permeation rate.

(continued overleaf)

Note:

Documentation is available from:

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Patent status:

No patent action is contemplated by NASA.

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